

REMARKS

Applicants thank the Examiner for the very thorough consideration given the present application. Claims 1, 3-7, 9 and 11-12 are currently pending in this application. No claims have been amended. Accordingly, no new matter has been added.

In view of the remarks herein, Applicants respectfully request that the Examiner withdraw all outstanding rejections and allow the currently pending claims.

Issues Under 35 U.S.C. 103(a)

Claims 1, 3-7, 9 and 11-12 remain rejected as being unpatentable over Stine '252 in view of Lyman '823. Applicants respectfully traverse.

The Examiner stands by his previous position that the cited prior art renders the present invention obvious. The Examiner maintains that Stine '252 discloses a process for producing a motor fuel component that comprises paraffins, wherein the process comprises hydrotreating an olefinic stream obtained from a process in which butenes are dimerized. The Examiner further argues that the reactants flow downward through the catalyst beds, thus making the reactor of Stine '252 a trickle bed reactor.

The Examiner acknowledges that Stine '252 fails to disclose several limitations of the present invention, but relies on the teachings of Lyman '823 to establish that it would have been obvious to one of ordinary skill in the art to modify Stine '252 by: 1) utilizing a liquid feed for the hydrogenation process; 2) utilizing a sulfur-containing stream; 3) using a feed containing the olefin types and amounts claimed; 4) using catalyst metal amounts as presently claimed; and 5)

using "conditions as claimed in the process of Stine because such conditions are within the ranges disclosed by Stine".

Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Additionally, there must be a reason why one of ordinary skill in the art would modify the reference or combine reference teachings to obtain the invention. A patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. *KSR Int'l Co. v Teleflex Inc.*, 82 USPQ2d 1385 (U.S. 2007). There must be a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. *Id.* The Supreme Court of the United States has recently held that the "teaching, suggestion, motivation test" is a valid test for obviousness, albeit one which cannot be too rigidly applied. *Id.* Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *Id.*

Initially, it is noted that the Examiner maintains his arguments that Stine '252 discloses trickle bed reactors asserting: "As shown in the figure, the reactants flow downward through the catalyst beds. It is clear that these reactors are trickle bed reactors". Applicants respectfully and strongly disagree.

It remains unclear on which basis the Examiner assumes that the reactors of Stine '252 are trickle bed reactors. As noted in multiple previous occasions, a gas phase reactor may

certainly operate in downflow mode; however, downflow alone does not make a gas phase reactor become a trickle bed reactor.

A characteristic and essential feature of a trickle bed reactor, in addition to downward flow, is the presence of both liquid and gas phases in the reactor. The very name of this type of reactor type is based on this characteristic: the liquid phase "trickles" down through the catalyst bed.

As discussed in the Declaration submitted on June 26, 2007 a copy of which is resubmitted herein for the Examiner's benefit, the fluid in Stine '252 is supercritical. This means that there simply cannot be any liquid phase present in the reactor. Stine '252 explicitly states: "Preferably, the reaction conditions are selected to keep the hydrocarbon feed in a vapor phase" (Stine '252, column 14, lines 33-34). As evidenced by the Declaration, the hydrocarbon feed is in the vapor phase under the conditions applied by Stine '252. Thus, it is absolutely clear that the reactors of Stine '252 cannot possibly be trickle bed reactors, as there is no liquid phase present. The reactors of Stine '252 are not trickle bed reactors. Thus, Stine '252 cannot possibly teach or suggest the use of trickle bed reactors in a process as defined in the present claims.

In order to carry out a trickle bed operation in the process of the present invention, it is essential that supercritical conditions be avoided. This is accomplished by 1) excluding the C₄ hydrocarbons from the saturation reactor feed, and 2) by limiting the maximum temperature below 300°C, thus making trickle bed operation possible. These differences of the feed are substantial and critical, and result in significant differences in reactor design and operation.

Stine '252 describes the saturation zone at column 13, line 57 to column 14, line 68. The limits set are very broad, but the principle becomes clear in the previously quoted statement about the phase of the feed: Stine '252 discloses a vapor phase feed.

Moreover, although Stine '252 discloses a number of possible catalysts, two particularly applicable groups of catalysts are recommended: the ones containing a combination of nickel or cobalt with molybdenum. It should be noted that Stine '252 does not mention noble metal catalysts as a preferred choice: these are mentioned only as general information and for completeness. The preferred catalysts for saturation are nickel or Co-Mo or Ni-Mo catalysts.

Stine '252 fails to disclose or suggest that the feed is in the liquid phase, that the feed composition or feed contains sulphur compounds, or the amount of metal on the catalyst or reaction conditions in each reactor. Clearly, Stine '252 fails to teach or suggest a process as presently claimed. Moreover, contrary to the Examiner's assertion, Lyman '823 fails to cure the deficiencies of Stine '252.

The Examiner quotes four passages of Lyman '823 to support his assertion that Lyman '823 cures the deficiencies of Stine '252. The first quoted paragraph is on page 4, lines 20-35. However, upon closer examination, it is noted that lines 20-33 apply to some unidentified minor impurities present in the feed, having a negative impact on the acidic polymerization catalyst, and irrelevant in this case.

Lines 33-62 on page 4 of Lyman '823 refer explicitly to sulphur containing components. However, the actual teaching given in this passage is not that which the Examiner asserts. Lyman '823 teaches treating the feed containing acidic sulphur compounds (i.e., hydrogen sulphide and mercaptans) with an alkaline solution, prior to the polymerization step (see page 4,

lines 60-62). Treatment with an alkaline solution ("caustic wash") is a commonly known and widely adapted procedure used to remove acidic sulphur compounds from hydrocarbon streams. Thus, application of the teachings of Lyman '823 will result in a feed very low in sulphur being sent to the polymerization and subsequent hydrogenation steps. Clearly, the cited passage does not teach or suggest the feeding of sulphuric components to the hydrogenation section.

At page 5, lines 8-70, Lyman '823 discusses two alternative methods of hydrogenation. It should be noted that Lyman '823 considers these procedures "widely different" (see line 10). The first method (see lines 14-47) is suitable for polymer liquids low in sulphur. It uses a nickel-based catalyst and moderate conditions. Applicants note that it is clearly explained that minor amounts of sulphur appreciably reduce the activity of the catalyst, making this process unsuitable for feeds containing any substantial amount of sulphur.

The second method disclosed by Lyman '823, which is "particularly adapted for use with high sulfur polymers" (see page 5, lines 49-50), uses hydrogen under a 3000-3500 pound per square inch (206.85 – 241.33 bar) pressure and a sulphur insensitive catalyst, such as molybdenum sulphide, at a temperature of 460-480°F (237-248.9°C). Clearly, the catalyst and operating pressure are significantly different from those stipulated in present claim 1 (noble metal catalyst on alumina support and 20-70 bar, respectively).

Thus, Applicants submit that the combined teachings of Stine '252 and Lyman '823 fail to teach or suggest each and every limitation of the present invention. For this reason alone, this rejection should be withdrawn.

Furthermore, assuming *arguendo* that Lyman '823 cured the deficiencies of Stine '252, it is noted that references cannot be arbitrarily combined. There must be some reason why one of

ordinary skill in the art would be motivated to make the proposed combination of the primary and secondary references. *In re Nomiya*, 184 USPQ 607 (CCPA 1975). Courts have clearly established that, even when a combination of references teaches every element of a claimed invention, a rejection based on a *prima facie* case of obviousness is improper absent a motivation to combine. *In re Rouffet*, 149 F.3d 1350, 47 USPQ2d 1453 (Fed. Cir. 1998).

Lyman '823 explicitly teaches how to treat a feed containing sulphur; Stine '252 does not. Thus, a skilled person designing a process to treat a feed containing sulphur, based on these references, would obviously select the alternative of Lyman '823 and the result would be different from the current invention. One skilled in the art would not have been motivated to modify Lyman '823, as this would require acting against the teachings of the reference.

An analysis of Stine '252 in view of Lyman '823 gives a clear picture of the current level of technology: nickel based catalysts are beneficial and recommended for very low sulphur feeds, and molybdenum-containing catalysts under severe conditions are preferred if sulphur is present. This is not only a theory, but also the actual industrial practice. Thus, it is a highly surprising and unexpected finding that a noble metal catalyst could be efficient in this application under the relatively moderate conditions applied.

Clearly, the present invention is not disclosed or made obvious by the cited prior art. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

Conclusion

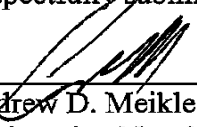
All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding rejections and objections and that they be withdrawn. It is believed that a full and complete response has been made to the outstanding Office Action and, as such, the present application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Marc S. Weiner, Reg. No. 32,181 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.147; particularly, extension of time fees.

Dated: June 26, 2008

Respectfully submitted,

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Enclosure: Copy of Declaration Under 37 CFR 1.132 submitted on June 26, 2007

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Lehtonen et al.	Conf.: 7510
Serial No.:	10/681,251	Group: 1764
Filed:	October 9, 2003	Examiner: NGUYEN, Tam M.
For:	PROCESS FOR THE MANUFACTURE OF A GASOLINE BLENDING COMPONENT	

DECLARATION SUBMITTED UNDER 37 C.F.R. 1.132

Honorable Commissioner
of Patents and Trademarks
Washington, D.C. 20231

June 26, 2007

Sir:

I, Isto Heino EILOS, of Neste Jacobs Oy, Finland, do hereby declare the following:

I graduated from Helsinki University of Technology in 1982 with the degree of Master of Science (Chem.Eng.)

I have participated at various process investment and development projects at Neste Oyj during years 1982 to 2001, at Neste Chemicals years 1991 to 1996 and after that until now at Neste Jacobs, formerly Neste Engineering Oy, which was formerly a department of Fortum Oil and Gas Oy, formerly Neste Oyj. My current position is Senior Engineering Associate with Neste Jacobs Oy.

I am familiar with the contents of the above referenced patent application, as well as the current processes used for producing isooctane.

I have read and understood the subject matter of the Office Actions of May 21, 2007.

There are essential differences between the process disclosed in Stine '252 (US 5,847,252) and the process according to the present application.

The composition of the feedstock coming out of the oligomerization zone and going into the saturation/hydrogenation zone in Stine '252 is different from the composition of the presently claimed feedstock. Stine '252 teaches to use C7 and lighter components (composition given in the table on column 16 for line 87). In the Example of Stine '252 there is high amount of C4 hydrocarbons, nearly 80 mol-%. Together with the disclosed operation conditions of 530 °F (276 °C) and 485 psi (33 bar) the fluid is inevitably in gas phase as it is over the critical point of the composition.

The attached figure shows a phase diagram for the feedstock of the process according to the present application. In the phase diagram each of the curves represent the portion of liquid in a two-phase situation, below the lowest curve the phase is completely liquid and above the highest curve the phase is completely gas. The feed of the present application contains practically no C4 components, but there are mainly C8 and higher components. This is also evidenced in Example 3 of the present application, describing the feed to the hydrogenation containing 98.4 % of C8 and C12 olefins. Further, Table 1 provides results of analysis of the final product obtained in Example 1, containing C8, C12 and some C16 components and negligible amounts of other components. This provides evidence of the carbon number distribution of the feed because hydrogenation does not alter the carbon number.

The critical point of the feed is about 280 °C and 33 bar meaning that the critical point for the feed going into the saturation/hydrogenation zone in Stine '252 (the Example) is much lower. As the operation temperature in the process according to the present application, also shown in the examples, is much lower compared to the critical point, it is evident that there exists high amount of liquid in the reactor and the flow conditions are therefore totally different compared to Stine's conditions. All facts clearly point out that the intention of Stine '252 was to operate process in gas phase, which is not the case in the present application, where a high amount of liquid is present.

Further, in Stine '252, particularly at the reaction conditions of the example, the reaction mixture is more or less above the critical point, which means that there is not available liquid for wetting of the catalyst. In trickle-bed reactors it is essential that the catalyst is wetted by the liquid and the reaction takes place on the wetted catalyst. This not the case in Stine '252 and thus the reactors in the hydrogenation zone in Stine '252 are not trickle-bed reactors.

As such, in my opinion, the instant invention is both novel and unobvious over the prior art cited by the Examiner.

The undersigned hereby declares that all statements made herein are based upon knowledge are true, and that all statements based upon information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: 26 June 2007



Isto Eilos

